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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.              | CONFIRMATION NO.       |
|---|-------------|----------------------|----------------------------------|------------------------|
| 10/540,638  | 06/23/2005  | Yasuhiro Yamakoshi   | OGOSH34USA                       | 5367                   |
| 270 7590 11/29/2007<br>HOWSON AND HOWSON<br>SUITE 210<br>501 OFFICE CENTER DRIVE<br>FT WASHINGTON, PA 19034 |             |                      | EXAMINER<br>VELASQUEZ, VANESSA T |                        |
|   |             |                      | ART UNIT<br>4116                 | PAPER NUMBER           |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/540,638

**Applicant(s)**

YAMAKOSHI, YASUHIRO

**Examiner**

Vanessa T. Velasquez

**Art Unit**

4116

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2 and 11-28 is/are pending in the application.
- 4a) Of the above claim(s) 25-28 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 11-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/S5108)  
Paper No(s)/Mail Date 11/04/2005
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Election Acknowledged*

1. Restriction is required under 35 U.S.C. 121 and 372. This application contains the following inventions or groups of inventions that are not so linked as to form a single general inventive concept under PCT Rule 13.1. In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

**Group I**, claims 1-2 and 11-24, drawn to a nickel-tantalum alloy sputtering target.

**Group II**, claims 25-28, drawn to a method of manufacturing a nickel-tantalum alloy sputtering target.

2. The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

Unity exists only when there is a technical relationship among the claimed inventions involving one or more of the same or corresponding claimed technical features. The express "special technical features" are defined as meaning those technical features that define a contribution which each of the inventions, considered as a whole, makes over the prior art" (Rule 13.2). The examiner has retroactively considered the question of unity of invention in view of the search performed. A review of JP 62040363 A makes clear that the claimed species is not novel over the prior art. In JP 62040363 A, Suzuki et al. teach a sputtering target composed of 0.5-15 at% Ta, 40-90 at% Ni, and 10-50 at% Fe. Furthermore, this reference appears to demonstrate

that the technical feature, the Ni-Ta sputtering target, does not define a contribution which each of the inventions, considered as a whole, makes over the prior art. Thus, lack of unity becomes apparent *a posteriori*, i.e., after taking the prior art into consideration. Accordingly, the prior art of record supports the restriction of the claimed subject matter into the aforementioned groups.

The election of an invention may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable on the elected invention.

Should applicant traverse on the ground that the inventions are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

***Election by Telephone***

3. In a reply by Mr. Bak on November 2, 2007, a provisional election was made to prosecute the invention of the nickel-tantalum alloy sputtering target, claims 1,2, 11-24. Affirmation of this election must be made by applicant in replying to this Office action. Claims 25-28 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

***Status of Application***

Claims 1, 2, and 11-24 are pending and presented for examination. Claims 25-28 are withdrawn in accordance with the restriction requirement set forth above.

***Priority***

4. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed on June 23, 2005 and has been placed of record in the file.

***Information Disclosure Statement***

5. The information disclosure statement (IDS) was filed on November 4, 2005. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

***Specification***

6. The disclosure is objected to because of the following informality: Typographical error in the abbreviation for nickel (p. 3, Line 22). Appropriate correction is required.

***Claim Objections***

7. Claims 1 and 2 are objected to because of the following informality: Incorrect diction. "Residual" implies that nickel is present as a leftover in small amounts. Examiner construes invention to contain a specific atomic percent of tantalum with the balance being nickel. Appropriate correction is required.

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. (JP 62040363 A).

Suzuki et al. teach a target composed of 40-90 at% Ni, 10-50 at% Fe, and 0.5-15 at% of one or more of the following elements: Mn, Cr, V, Nb, Ta, Ti, Zr, Hf, Si, Al, and Ge. A specific alloy by Suzuki et al. (p. 326, Table in Col. 1, Example 'e', First Line) contains 79.9 at% Ni, 4.9 at% Nb, 2.1 at% Si, the balance Fe. Although the example does not contain Ta, it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute Nb with Ta because they have similar chemical properties (see group VB of the Periodic Table of Elements). Consequently, the resulting target would be a functional equivalent due to their similar chemical properties.

"For gate electrode" is intended use and will not be accorded patentable weight.

11. Claims 11-14 and 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. (JP 62040363 A) in view of Shindo et al. (U.S. Pat. 6,485,542 B1).

Shindo et al. teach a highly pure Ni-Fe sputtering target for producing thin ferromagnetic films and a method for producing the same.

Regarding claims 11-12 and 18-19, Suzuki et al. fail to teach amounts of inevitable impurities in their target material. Shindo et al. teach that the total metal impurities in their target material is 50 ppm or less (Col. 1, Lines 66-67 to Col. 2, Line 1), but preferably 10 ppm or less (Col. 2, Lines 3-4). The encompassing of ranges is sufficient to make a *prima facie* case of obviousness (MPEP § 2144.05 Section I).

Regarding claims 13-14 and 20-21, Suzuki et al. fail to teach levels of impurities of oxygen, nitrogen, hydrogen, and carbon. In Example 1 of Shindo et al. (Col. 7, Lines 29-34), the following impurities are present in the following amounts:

- Oxygen: 8 ppm
- Nitrogen: < 1 ppm
- Hydrogen: 0.1 ppm
- Carbon: 5 ppm

It would have been obvious to one of ordinary skill in the art at the time of the invention to purify the alloy by Suzuki et al. using the method taught by Shindo et al. because Shindo's method produces a high-purity sputtering target that is less resistant to corrosion. Excessive amounts of impurities in the target decrease resistance to corrosion and have deleterious effects on the magnetic properties of the alloy (Shindo et al., Col. 2, Lines 60-63). Furthermore, Shindo's method is readily adaptable to targets containing Ni and Ta (Col. 2, Lines 33-38).

12. Claims 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. (JP 62040363 A) in view of Herzer (*IEEE Transactions on Magnetics*, Vol. 26, No. 5, September 1990).

Regarding claims 15 and 16, Suzuki et al. fail to identify the values of the magnetic permeabilities of their target material. Herzer conducted a study on how grain size and annealing temperature affect the magnetic properties of a nanocrystalline ferromagnetic alloy.



The magnetic permeabilities of the claimed invention are the result of heat treatments that are known to one of ordinary skill in the art. Figure 2 of Herzer illustrates how the magnetic permeability varies with annealing temperature. It would have been obvious to one of ordinary skill in the art at the time of the invention to apply the heat treatment of Herzer to the alloy by Suzuki et al. because annealing ferromagnetic alloys allows one to manipulate the magnetic permeabilities of such materials (Herzer, FIG. 2). High permeability is desirable for sputtering targets used in the production of magnetic recording devices.

Regarding claim 17, grain size is a direct result of processing steps (e.g., temperature, mechanical deformation). Altering grain size is routine practice to one of ordinary skill in the art of materials processing (Herzer, Experimental Section, First Paragraph).

13. Claims 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. (JP 62040363 A) in view of Shindo et al. (U.S. Pat. 6,485,542 B1), and further in view of Herzer (*IEEE Transactions on Magnetics*, Vol. 26, No. 5, September 1990).

Suzuki et al. in view of Shindo et al. fail to teach magnetic permeabilities and grain sizes of their alloys; however, these properties are the result of processing steps known to one of ordinary skill in the art. For instance, Herzer teaches that magnetic permeability and grain size depend on annealing temperature (Fig. 2; Experimental Section, First Paragraph). It would have been obvious to one of ordinary skill in the art

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at the time of the invention to modify Suzuki et al. in view of Shindo et al. by heat treating their alloy in the same manner as Herzer because materials with high magnetic permeabilities are effective targets in the production of high quality recording devices (e.g., see supporting reference U.S. Pat. 4,277,809 cited in PTO-892). In addition, finer grains make materials more uniform, resulting in higher quality film deposition in the sputtering process.

### ***Conclusion***

No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vanessa T. Velasquez whose telephone number is 571-270-3587. The examiner can normally be reached on Monday-Friday 7:30 AM-5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on 571-272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Vanessa T Velasquez/  
Examiner, Art Unit 4116

/Vickie Kim/  
Supervisory Patent Examiner, Art Unit 4116

